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2001 – A Year of Transition

This year was one of transition for the management team at the Los Alamos Neutron Science Center (LANSCE). The new year not only began with the departure of its Director for the past three years, but with the immediate arrival of a new leader. Paul Lisowski officially became the LANSCE Director on January 7, 2001, and with the outage in full swing, he hit the ground running preparing LANSCE for its most successful run cycle since 1997.

The year also saw management changes in other areas. Joyce Roberts, Group Leader of the Lujan Neutron Scattering Center (Lujan Center) for over five years, moved on to become the LANSCE Division Senior Advisor. Although her leadership at Lujan Center has been sorely missed, the transition was made easier with the arrival of Alan Hurd, formerly of Sandia National Laboratories. Hurd, a former user and Chair of the User Group Executive Committee from 1996 to 1997, joined the Lujan Center on February 12, 2001, as Group Leader and as program manager for LANSCE's interactions with DOE's Office of Basic Energy Sciences.

LANSCE Division also reluctantly said goodbye to a valued employee and friend. Earl Hoffman retired on June 1, 2001, ending an outstanding 26-year career at LANSCE. He was instrumental in accelerator operations and in beam-line physics and control systems from the early days of the (Clinton P. Anderson) Los Alamos Meson Physics Facility through what is LANSCE Division today. Kevin Jones, formerly the Accelerator Operations Manager, was selected to fill the Deputy Division Director vacancy created by Hoffman's retirement. In his new position, Jones has principal responsibility for ensuring that the LANSCE accelerator complex operates safely with high reliability and availability and provides beam to all LANSCE users.



← Earl shows his amusement at the gift the rf team gave him—a lamp fashioned from an old vacuum tube. Pictured with Earl is John Lyles, LANSCE-5.

This new management team began 2001 with the challenge of carrying out the outage activities planned in 2000 towards the successful start of a full user program in July. For more information on how the run cycle went, see the Accelerator Operations and User Program section starting on page 163.

Annual Holiday Drive Provides for 103 Taos Children

Once again, LANSCE employees have responded with an outpouring of generosity to the annual Holiday Drive organized by LANSCE Division Executive Administrator, Ginger Grant. It seems that every year the volume of presents collected for each child increases, turning the entire Division Office suite into a temporary Santa's workshop. Grant contacts a different agency in the northern New Mexico area each year to come up with a list of children that might not otherwise have such a bountiful holiday. This year, the recipients were from the Taos area, a small town about 50 miles northeast of Los Alamos. She then sends out the call to "Santa's helpers" throughout the Division and other resident groups, who select a child or children and usually provide everything on their wish lists (clothing, shoes, and a toy).

In total, over 100 children received presents courtesy of LANSCE this year. Although we don't get to see the recipients open their gifts, there is a tangible amount of joy when you walk through the Division Office during the wrapping and collection phase. This year, the Division Office invited everyone up to view the wrapped presents and indulge in hot cider and sweets before the gifts were taken to the parties. Grant's list of helpers for 2001 included Jeannette Christensen, Joyce Roberts, and Joan Thompson (LANSCE-DO), Bonnie Martinez and Lynn Varoz (HR), Lynnette Trujillo (LANSCE-1), Vi Maes (LANSCE-2), Anne Donohoe (formerly of LANSCE-3), Evan Sanchez (LANSCE-4), Viola Martinez (LANSCE-6), Kristine Smith and Julie Quintana (LANSCE-12), and Tracy Martinez (LANSCE-FM).



↑ Some of Santa's helpers along with just a few of the many gifts collected in the 2001 drive.

TA-53 Participates in the Relay for Life

It is rare to find anyone whose life has not been touched in one way or another by cancer. Several TA-53 personnel participated in the 2001 American Cancer Society's Relay for Life, an annual event to honor those who have had cancer and to generate donations for research and assistance to those surviving with cancer. Several teams participated in an 18-hour relay walk around Ashley Pond. In addition to showing that cancer never sleeps, they also raised a great deal of money for the American Cancer Society.

Many Mesa residents participated in this event as relay team members doing a 1-hour lap around Ashley Pond and/or as monetary donors to the American Cancer Society. Additionally, our TA-53 community purchased *farolitos* commemorating cancer victims or survivors. *Farolitos* are the traditional New Mexican lanterns made of brown paper lunch bags, sand, and candles, which are used to decorate homes during the Christmas holidays. These were displayed at Ashley Pond as part of the other relay events. Last year, nearly \$50,000 was raised during the event.

Electro-Mechanical Technology Program Graduates Two More Students

The Electro-Mechanical Technology Student Training Program, currently in its fifth year, is a two-year certificate program designed to help students receive valuable academic and on-the-job training in the field. Two more students have completed the program and graduated from the University of New Mexico at Los Alamos (UNM-LA) in May 2001. Subsequently, Shawn Newman has accepted a position in LANSCE-5, and Gary Salazar is currently employed in the Los Alamos National Laboratory's (LANL) Dynamic Experimentation Division.

The program promotes and provides access to opportunities in higher education for those entering the workforce for the first time or workers in need of retraining. Under the program, students spend half their time studying at UNM-LA and the other half working under the guidance of mentors at LANL. The new class starting the Fall 2001 term is the biggest class ever with 14 new students joining.

A New LANSCE Professorship Position Established at the University of California at San Diego

As part of an effort to strengthen the relationships between LANL and nearby universities, a joint professorship position was established between the New

Mexico State University and LANSCE. This position, occupied by Heinz Nakotte since August 1997, was envisioned as the first of others at New Mexico and California campuses. This vision has been realized with the addition of Dr. Sunil "Sunny" Sinha, formerly at the Advanced Photon Source at Argonne National Laboratory, as LANSCE Professor at the University of California at San Diego. Dr. Sinha, a distinguished condensed matter physicist with a long background in neutron scattering, began the position in August 2001.

Meeting with Nobel Laureates Inspires Geophysics Graduate Student

Shannon McDaniel, a Graduate Research Assistant at the Lujan Center, attended the 51st annual Lindau Meeting in Germany, which brought together 17 Nobel Prize laureates and over 500 graduate students from around the world. McDaniel was selected to represent LANL at the June 25-29, 2001, meeting.



↑ Shannon McDaniel.

In describing her experiences at Lindau, Shannon says, "These [Nobel Prize winners] are extremely bright people who were in the right place at the right time, for the most part, and they ended up with fantastic discoveries.

Throughout the meeting, they had the most interesting and liberal opinions, and clearly had astounding creativity. I cannot express here everything that I learned, but it was an eye-opening experience. Most importantly, I met many graduate students from around the world, and we discussed in length our work and future interests, so I feel I made some really great connections."

Shannon, a Ph.D. candidate in geophysics at the University of Washington, is working at the Lujan Center on the texture analysis of a fossilized sand dollar. Her degree work focuses on the rheology or flow patterns of ice under conditions on Earth and on other planets. She is here on a National Physical Science Consortium Fellowship, where the fellowship pays up to six years of tuition, and LANL pays a summer stipend. Not only does Shannon have time for all this, she is also busy planning for a June 2002 wedding!

LANSCe Staff Selected as Distinguished Performers

Kathy Lovell, a design team supervisor at the Lujan Center, won a 2000 Distinguished Performance Award for her significant contributions to the development of the three spectrometers for the Short-Pulse Spallation Source (SPSS) Enhancement Project. Lovell worked on the design and implementation of SMARTS (Spectrometer for Materials Research at Temperature and Stress), HIPPO (High-Pressure Preferred

Orientation) diffractometer, and the Protein Crystallography Station. Her efforts were key to the completion of the Protein Crystallography Station in time for scientists to take its first neutron beam on sample in December 2000—a highly visible DOE project milestone. She also worked concurrently on DANCE (Detector for Advanced Neutron Capture Experiments), an experimental nuclear physics flight path. Mark Taylor, a



↑ Kathy Lovell.

mechanical engineer at the Lujan Center, wrote in a letter of recommendation, "It would be difficult to estimate the amount of time and money Kathy has saved the Lujan Center with her detailed knowledge of the construction of the experimental areas and instruments." Lovell followed the parts through the fabrication process, tracked them until installation began, and then spent many hours ensuring their safe, proper installation. She also worked closely with others on the project and gave 100% of her considerable talent to meet rigid specifications and tight schedules. At times, Lovell's efforts to the project included driving truckloads of shielding to vendors, unloading steel shielding off delivery trucks with a forklift, and carrying out quality assurance checks on equipment before it was delivered. Lovell's extreme dedication to her work was also evident when the LANSCE-12 Group Leader asked for volunteers to help with the mercury clean up at the Lujan Center. She donned protective clothing and pitched in for many long days, well above the call of duty of a lead designer. Lovell's skill and dedication have been essential to the successful operation of the Lujan Center.

The LANSCE-7 Experimental Areas Support team (James Abernathy, Steve Cushing, Julian Garcia, and Joe Medina) received a 2000 Distinguished Performance Award for their work installing three new beam lines for the SPSS Enhancement Project. This



↑ LANSCE-7 Experimental Areas Support Team, Julian Garcia, James Abernathy, and Joe Medina. Not pictured is Steve Cushing.

team is normally responsible for a wide variety of construction and maintenance activities at the accelerator facility, but constructing beam lines at the Lujan Center is not a normal part of their duties. With the Lujan Center mechanical team fully occupied with preparing the facility and existing instruments for the upcoming run cycle, Jon Kapustinsky (Spectrometer Development Project Leader) approached the team for help, and they came onboard with enthusiasm, creativity, and flexibility. Their dedication resulted in the three beam lines being finished on schedule. The team members not only performed above normal job requirements but also often solved design-engineering problems. One such instance occurred when the contractor-designed SMARTS "cave" was being installed. When large samples need to be placed in the cave for future experiments, the roof has to be removed. The team realized that once the roof was put into place according to the original design, it could not be removed again. They proposed an alternate solution using a custom-lifting fixture to put the roof in place with the overhead crane. They designed the fixture, had it approved by a certified engineer, fabricated the part, and ensured that the part was properly certified. Throughout the project, the team never compromised safety while devising appropriate and creative field solutions to assembly or design problems and while remaining keenly aware of the schedule constraints. Their willingness to extend themselves beyond expectations ultimately saved time and money for the SPSS Enhancement Project.

Distinguished Performance Awards are given annually by LANL to a select number of individuals and small teams that have made an outstanding and unique contribution that has had a positive impact on LANL's programmatic efforts or status in the scientific

community or performed outstanding administrative or operational activities that enabled programmatic or scientific achievements. Additional criteria include unusual creativity or dedication and a level of performance substantially beyond what is normally expected.

Other Award Winning LANSCE Staff and Users

Remember those funny-looking "shmoos" featured in the 1999-2000 LANSCE Activity Report? From 1985 to 1995, these 204 gamma (γ) ray detectors placed at various locations at LANSCE were looking for evidence of γ -ray emissions from cosmic sources at high energies. When the project concluded, the detectors were removed from their protective housings, which remained scattered over several acres of land at TA-53 until they were moved in July 2000. As part of the Laboratory Education Equipment Gift Program, they were moved to the California Institute of Technology (CalTech) for cosmic-ray research. This idea for recycling the "shmoos" earned both a **Department of Energy (DOE)** and a **LANL Pollution Prevention Award** for LANSCE-FM waste management and safety staff **Alan Gibson, Tom Nolen, Marc Taylor, and Ben Poff**. Students under Valerio Armijo, P-25, assisted, and Todd Haines, P-23, coordinated the arrangement with CalTech.

J. David Bowman (P-23) is the recipient of the **2002 Tom W. Bonner Prize in Nuclear Physics**. He was awarded the prize "...in recognition of his leadership in performing precision measurements involving tests of fundamental symmetries, including his studies of parity non-conservation in compound nuclei." Bowman recognized that LANSCE was the only facility in the world with the characteristics that would make such measurements possible by scattering longitudinally polarized neutrons from compound nuclei. He developed techniques based on the use of detectors in the "current" mode and a broad energy-range spin flipper that would be able to use the high fluxes of LANSCE to accomplish the goal.

Three members from the LANSCE-4 Communication Team won awards from the **Society for Technical Communication (STC)**. The STC is a professional organization dedicated to advancing the art and science of technical communication, which sponsors an international competition to recognize and encourage excellence in communication through printed media. Judges evaluate each entry for such qualities as design and typography, copy editing, content and organization, and graphics. The LANSCE communicators were awarded the following levels of distinction for their

entries: **Award of Excellence for Technical Art** for the CD design for the Real-Space Pair Distribution Function Methods Workshop, **Sharon Mikkelsen**; **Award of Excellence** for the poster design for the 5th LANSCE User Group Meeting, **Award of Merit in Technical Art** for the poster design for the 9th Annual Workshop on Advanced Accelerator Concepts; and the **Award of Merit in Technical Art** for the conceptual cutaway of SMARTS, **Garth Tietjen**; and **Award of Merit in Technical Publications** for the LANSCE Division technology review paper on the Protein Crystallography Station, **Grace Hollen**.

Larissa Dobrzhinetskaya was awarded the **University of California at Riverside Distinguished Scientist of the Year Award**. At the time of the award, Dobrzhinetskaya was a Mid-Career Visiting Scholar for the Institute of Geophysics and Planetary Physics at Riverside and LANL. A tremendous researcher, according to Lujan Center Director, Al Hurd, she received the award for her significant contributions to earth science of the mantle, olivine, and the behavior of minerals at high pressure. Dobrzhinetskaya worked with Kristin Bennett (Lujan Center) on microdiamonds and shungite using neutron scattering at the Lujan Center. She is currently back at the University of California at Riverside.

Ferenc ("Feri") Mezei of the Lujan Center was honored by the Council of the **American Physical Society (APS)** with a **Fellowship** in the Society. His Fellowship was nominated through the Division of Condensed Matter Physics for his leadership in developing new techniques for neutron-scattering studies of condensed matter, including the invention of the neutron-spin-echo method. In addition to his affiliation with the Lujan Center, Mezei is a Professor at the University of Berlin and the Director of the Berlin Neutron Scattering Center. Election to Fellowship in the APS is limited to no more than one-half of one percent of membership each year.

The **National Nuclear Security Administration** has honored the **GEANIE team**, made up of members from both LANL and Lawrence Livermore National Laboratory, with its **Defense Programs Award of Excellence**. The award is for the first accurate measurement over a wide energy range of the cross section, or probability of reaction, linking two key isotopes of plutonium: ^{239}Pu , the isotope used in nuclear weapons, and ^{238}Pu . The team obtained results for the cross section that are accurate to about 10% over most of the energy range of interest. Team members from LANL include **Ron Nelson, Gregg Chaparro, Matt Devlin, Darrell Drake, and Glen Johns**, LANSCE

News and Events

Division; Scott Wilburn, Physics Division; and Mark Chadwick and Phil Young, Theoretical Division.

Mark Parsons, LANSCE-AHF, also received a **Defense Programs Award of Excellence** for significant contributions to the Stockpile Stewardship program in his role as Project Engineer for the \$48 million Atlas Project.

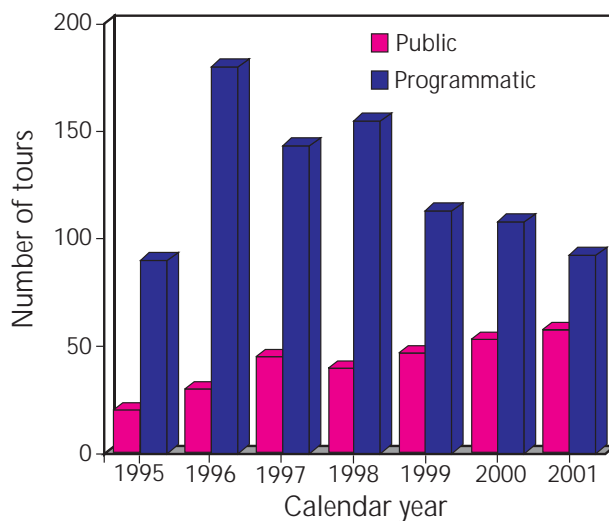
Tours

LANSCE is still an important and popular stop for tours whether from school or community groups or visiting dignitaries. Not only were we paid our annual visit by the Atomic Energy Merit Badge Scout Troop, but our list of guests in 2001 include U.S. Senator



↑ The Borger High School tour starts at the LANSCE Visitor Center with an overview given by Matthew Murray, P-25.

Pete Domenici, R-N.M., and staffer Chris Gallegos; Mildred Dresselhaus, former Director of the Office of Science; John McTague, Vice President for the University of California for Laboratory Management; the Strategic Defense Council; and the Flying Physicians Association among many, many others. The Flying Physicians Association group was 200 strong; therefore, they were treated to a bus tour of the site. Additionally, LANSCE played host to a group of about 66 CEOs/VPs in the concrete industry interested in collaborations with LANL. Their tour included presentations, informational packets, and lunch, arranged with help from the User Office and the Lujan Center.



↑ These tour statistics do not reflect the over 780 individuals that visited the LANSCE site during 2001. The facility hosted a record number of large (> 50) groups this year.



↑ Visiting representatives from the concrete industry, hosted by Kristen Bennett (Lujan Center), listen to Rex Hjelm, instrument scientist for the Low-Q Diffractometer.

2001 Lujan Seminar Series

05-Feb	News from the European Spallation Source Project	F. Mezei	LANL/Hahn-Meitner-Institut
12-Feb	Mossbauer Diffractometry and Inelastic Nuclear Resonant Scattering Studies of Alloys	B. Fultz	California Institute of Technology
09-Apr	Pore Fractals and Invasion Percolation in Activated Carbons	P. Pfeifer	LANL/University of Missouri
17-Apr	From Elementary Excitations to Microstructures: The thermodynamics of metals and alloys across length scales	M. Manley	LANL/Lujan Center
23-Apr	Statistical Mechanics of Granular Media	E. Ven-Nain	LANL/T-13
30-Apr	Physics in Cell Biology: Molecular Motors and Biomaterials	E. Frey	Harvard University
07-May	Physics of Proteins	H. Frauenfelder	LANL/CNLS
14-May	Neutron Scattering Experiments in Non-fermi Liquids	T. Kelly	LANL/Lujan Center
22-May	Interface Effects in Ultra-Thin Films: Magnetic, Chemical and Electric Properties (+)	S. Park	University of Arizona
04-Jun	Electron Correlation and Plutonium Phase Diagrams	A. Lawson	LANL/MST-8
11-Jun	Quantum Computation	R. Laflamme	LANL/T-6
24-Jun	Anisotropic Giant Magnetoresistance	T. Charton	West Virginia University
02-Jul	Teaching Diffraction Using Computer Simulations Over the Internet: A dry run. . . .	T. Proffen	LANL/Lujan Center
09-Jul	The Complex Oxidation Behavior of Pd Combustion Catalysts	A. Datye	University of New Mexico
16-Jul	Magnetized Target Fusion, aka Fusion in a Beer Can?	G. Wurden	LANL/P-24
17-Jul	Unusual Contributions of Molecular Architecture to Rheology and Flow Birefringence in Hyper Branched Polystyrene Melts	S. Kharchenko	Wayne State University
25-Jul	The Porod LAW for Anisotropic Samples	S. Ciccariello	Universita di Padova
26-Jul	Neutron Optical Elements Made at HMI	T. Krist	Hahn-Meitner-Institut
06-Aug	Diffuse X-ray Scattering and Models of Disorder	R. Welberry	Australian National University
13-Aug	Scientific Opportunities at the Australian Replacement Research Reactor	R. Robinson	Australian Nuclear Science & Technology Organization
16-Aug	A Structural Characterization of Metal Supra Molecular Polyelectrolytes and their Aphiphile Complexes in Solution	D. Kurth	Max Plank Institute of Colloids and Interfaces
27-Aug	Comparing Inelastic X-rays and Neutron Scattering Measurements of Phonons in Correlated Electron Systems	R. McQueeney	LANL/Lujan Center
10-Sep	Nuclear Fission Barrier Calculation in Five Dimensions	P. Moller	LANL/T-16
13-Sep	Liquids and Glasses in the "Landscape" Paradigm	A. Angell	Arizona State University
17-Sep	Co-deposition of the DEB-Palladium Hydrogen Getter System	D. Carroll	LANL/MST-7

2001 Lujan Seminar Series (continued)

15-Oct	Statistic and Dynamics of Electron-Phonon Coupling	S. Trugman	LANL/T-11
22-Oct	Studies of Excited Electronic and Vibrational States in Charge-Transfer Materials	A. Shreve	LANL/B-4
24-Oct	Therapeutic Protein Stability: Effect of PEGylated Phospholipids	C. Kirchhoff	University of Illinois
25-Oct	Status of the PSR Beam Experiments and Improvement Program	R. Macek	LANL/LANSCE-DO
29-Oct	Neutron Scattering at High Magnetic Fields: Status and Prospects of Sample Environment at HMI-BENSC	M. Meissner	Hahn-Meitner-Institut
30-Oct	High Pressure—A New Dimension in Physical Science	H. Mao	Carnegie Institution of Washington
05-Nov	Supported Lipid Bilayer Membranes on Hydrated, Nanoporous Thin Film Silica Mesophases	A. Parikh	LANL/B-4
19-Nov	Metals in Nanoparticle Arrays	R. Averitt	LANL/MST-10
20-Nov	Pressure as a Pro of the Physics of Ferroelectrics: Ferroelectric to Relaxer Crossover and Manifestations of Quantum Fluctuations	G. Samara	Sandia National Laboratories
03-Dec	Carbon Black Flocculation in Rubber Compound: A quality issue in rubber technology	M. Gerspacher	Sid Richardson Carbon Company
10-Dec	Measurements of Phonons and Phonon Entropy of Materials	B. Fultz	California Institute of Technology
10-Dec	A High Resolution Third Generation Powder Diffractometer at the SNS	J. Hodges	California Institute of Technology
19-Dec	Chemistry Beyond Carbon	S. Bobev	University of Notre Dame

Other LANSCE-sponsored Seminars, Conferences, and Workshops

03-Jan	The Route to Anti-Hydrogen	G. Rouleau	CERN
08-Jan	RF-Driven Negative Ion Sources: An Option for Future Neutral Beam Heating	P. McNeely	
28-Feb to 2-Mar	Second HIPPO Neutron Diffractometer User Workshop for Materials and Earth Sciences		
10-May	Measurement of the $g(3.14)NN(t)$ Form Factor Using Electroproduction of a Charged Pion from a Free Proton	K. Vansyoc	LANL
04-Jun	Fringe Field Effects and Optimal Simplification of Maps	B. Erdelyi	Michigan State University
12-Apr	The LEDA Beam Halo Experiment	M. Schulze J. Gilpatrick	LANL/LANSCE-1 General Atomics
10-Jul	Variable-Phase High-Current Asynchronous Cyclotron for ATW	Z. Guiragossian	Yerevan Physical Institute
17-Jul	RF and Beam Diagnostics for IPHI	P. Ausset	CEA
06-Aug	The Neutron Time of Flight Facility at CERN	V. Lacoste	CERN
12-Aug to 14 Aug	Fifth LANSCE User Group Meeting		
24-Oct	H ⁻ Magnetic Beam Extractor Design for the KOMAC Project	H. Ahn	KAERI
05-Nov	High Energy Neutron Dosimetry	M. Sutton	Georgia Institute of Technology
15-Nov	Self-Healing Capacitors for Pulse Power Applications	C. Vincent	Thomson Passive Components